PATENT SPECIFICATION

668,983

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COMPLETE SPECIFICATION

Improvements in or relating to Glassware-forming Machines

We, HARTFORD-EMPIRE COMPANY, a corporation organized under the laws of the State of Delaware, one of the United States of America, of 333, Homestead Avenue, City of Hartford, State of Connecticut, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed to be particularly described in and by the following statement :—

The present invention relates to the manufacture of glassware, and has particular relation to the production of glassware by forming machinery of the kind in which blanks or parisons are formed in blank molds, transferred to finishing molds and are there blown into final shape.

Hollow glassware may be made by one or the other of the following two known methods viz :—

(1) By feeding charges of molten glass into a blank or parison mold provided with a neck ring, pressing the charge into the general form of a hollow blank by means of a plunger reciprocable into and out of said mold, transferring the blank thus formed (usually by means of a transfer device engaging the neck ring) to and enclosing it within a blow or finish mold, wherein it is blown to final shape. In a modern machine for carrying out this method the blank mold is inverted, i.e. neck down, position and the formed blank is reverted by the transfer device so that it is located in the blow mold in upright, i.e. neck up, position. This method is known as a "press-and-blow" method.

(2) By feeding charges of molten glass as before into a blank mold, forming a relatively short indentation into the charge of glass enclosed in the neck ring mold by a reciprocable neck pin to initiate the formation of the neck portion and counter blowing the charge to the general form of a hollow blank by air pressure. In this method also the formed blank or parison may be in inverted, i.e. neck down, position and is transferred by a transfer device to a blow or finish mold wherein it is blown to the final form. This method is known as a "blow-and-blow" method.

Both of these methods have been adapted for use either with "single gob" feeders or "plural gob" feeders.

Heretofore (with the single exception hereinafter referred to) separate machines have had to be used for making hollow glassware by these two methods and a manufacturer desiring to change from blown ware to pressed and blown ware at a given ring hole is obliged to remove one machine and substitute another. The sole exception referred to is the Hartford-Empire Company's well-known I. S. Machine (see British Patent Specification No. 257,637) which was originally a single gob "blow-and-blow" machine, though more recently it has been made possible to make certain structural changes therein and additions thereto through which it may be converted into a "press-and-blow" machine and/or to a "double gob" machine without removal of the machine from the ring hole. Such changes and additions, however, are relatively extensive and require substantial periods of "down time" over and above that required to change molds, and to reset the feeder and timer in changing from the manufacture of one article to another.

The principal object of the present invention is to provide a machine which can be used selectively to produce glassware by either the "press-and-blow" or the "blow-and-blow" operations without the necessity for extensive changes such as are required to convert the Hartford-Empire I. S. Machine from a "blow-and-blow" operation to a "press-and-blow" operation ; in either operation the article being made either two at a time (double gobbing) or singly.

With this and other related objects in view the invention comprises a glassware forming machine for selectively making blown and pressed and blown ware having a preform

(blank or parison) mold provided with a neck ring and a carrier forming a permanent part of the machine on which carrier a neck pin or a pressing plunger may be interchangeably mounted, said carrier being reciprocable selectively to advance or retract a neck pin into and out of the neck ring or a pressing plunger into and out of the blank mold.

In order that the said invention may be clearly understood and readily carried into effect the same will now be described more fully with reference to the accompanying drawings in which :—

Figure 1 is a plan view showing a glassware forming machine which constitutes a preferred embodiment of the present invention ;

Figure 2 is a cross-sectional view taken on line 2–2 of Figure 1 ;

Figure 3 is a cross-sectional view of the pressing-plunger mechanism ;

Figure 4 is a partial cross-sectional view showing details of the adjustable mechanism for regulating the stroke of the pressing plungers and neck pins ;

Figure 5 is a cross-sectional view taken on line 5–5 of Figure 3 ;

Figure 6 is a cross-sectional view taken on line 6–6 of Figure 3 ;

Figure 7 is a cross-sectional view of a device for giving visual indications of the position of the hidden pressing plungers or neck pins ;

Figure 8 is a cross-sectional view similar to Figure 3 showing neck pins substituted for the pressing plungers of the latter view and the operating mechanism adapted for blowing rather than pressing of preforms.

The glass working apparatus of the present invention is illustrated in the accompanying drawings and comprises a single shaping machine or individual section A, (Figure 1) including a suitable base and frame structure, having a pair of blank or parison molds operable at a blank or parison-forming station B and a pair of blow molds operable at a blow mold station C. Each blank and blow mold is provided with associated forming mechanism and is capable of independently performing a complete glass fabrication operation at its station.

Suitable means (not shown) are provided for delivering formed mold charges or gobs of predetermined size and shape selectively to one or both blank molds of Section A.

The section A also includes a device D for transferring the preforms or parisons from the blank mold station B to the blow mold station C. A suitable timer control mechanism (not shown) will be provided for regulating the opening and closing of the molds and for individually regulating application of operating fluid pressure to the forming mechanism associated with each mold and cooling air discharged at stations B and C against the neck, blank and blow molds.

Provision is made for discontinuing the operation of the forming mechanisms associated with one pair of blank and blow molds without discontinuing the operation of the mechanisms associated with the other pair of molds whereby the Section A may be selectively adopted for single gob as well as double gob operation without interchanging its components. The section further includes permanent actuating mechanism for interchangeable forming members with which the blank molds may be selectively adapted for "blow-and-blow" and "press-and-blow" operation of the section.

These several mechanisms, constructions and components are described hereinafter in greater detail.

GENERAL CONSTRUCTION OF SECTION A

While only the single section A of a gob-fed glassware forming apparatus is illustrated in the drawings, it will be understood that, in actual practice, it is contemplated that a plurality of the individual sections A will constitute a forming machine.

Referring to the drawings, the forming machine section A is provided with a pair of blank or parison molds 1 and 2 which are disposed in permanently inverted positions at the blank-forming station B (Figure 1) ; a pair of blow molds 3 and 4 which are permanently disposed in neck-up positions at the finish blowing station C ; and a pair of neck ring molds 5 and 6 (Figure 2) which are adapted to be swung about a horizontal axis 7 from the blank-forming station B to the finish blowing station C and to transfer blanks or parisons from the blank or parison molds 1 and 2 to the blow molds 3 and 4 while, at the same time, inverting the blanks or parisons from their initial neck-down positions at the station B to neck-up positions at station C.

In connection with the alternative description of the preform molds 1 and 2 as "blank" or "parison" molds, it should be explained that the former term is intended to designate preforms made in the "press-and-blow" process, and the latter to designate the preform made in the "blow-and-blow" process. Hereinafter, when both of the terms are employed in the same sentence or claim, it is intended that this distinction be recognized. However, when the term "blank" stands alone and apart from any mention of "parison", it is intended to signify any preform regardless of whether it is made by the "press-and-blow" or the "blow-and-blow" process.

The molds 1, 2, 3 and 4 and the oscillating neck ring molds 5 and 6 are carried by a structure consisting of a rigid base structure generally designated 8, which is preferably relatively heavy so as to provide a firm support for the various operating parts, and

on which is mounted the drive and forming mechanism and associated parts of the molds. Although stationary in the embodiment illustrated, the base may be mounted on a rotatable turret or table if desired.

BLANK AND BLOW MOLD CONSTRUCTION

The blank molds 1 and 2 each comprises two halves or sections 1*a*, 1*b* and 2*a*, 2*b* (Figure 1), the sections of each mold meeting on a common irregular parting plane, suitable interlocking joints being provided to assure bringing the mold sections into correct registry when closed. The blow molds 3 and 4, similarly, each comprises sections 3*a*, 3*b* and 4*a*, 4*b* which meet on the common parting plane of the blank molds.

SECURING MOLDS IN HOLDERS

As shown in Figures 1 and 2, the blank mold halves or sections 1*a* and 2*a* in their inverted positions are detachably secured to a mold holder 9*a* and the mold sections 1*b* and 2*b* similarly are secured to a mold holder 9*b*.

Likewise, each of the blow mold halves 3*a*, 3*b*, 4*a* and 4*b* are secured upright in similar holders 10*a* and 10*b*. A simple engagement of the parts is employed so that it is only necessary to lift each mold section vertically upward from its holder to remove the section.

Each holder 9*a*, 9*b*, 10*a* and 10*b* also may be provided with recesses 14 (Figure 2) which are adapted to receive conforming projections on the mold sections and prevent the sections from being accidentally rotated relative to, or otherwise dislodged from, their mold holders.

PRESSING PLUNGER, OPERATING AND INTERCHANGEABLE NECK PIN COUNTERBLOWING MECHANISM

As shown in Figure 3 the glass charges are formed in the molds 1 and 2 into preforms or blanks 56 and 56*a* by two pressing plungers 57 and 57*a*, improved mechanism being provided for operating them as the first part of a "press-and-blow" forming cycle.

The present invention also provides for the same operating mechanism being employed to operate a pair of neck pins 58, 58*a* for forming the internal neck finish and to counterblow glass charges into a pair of parisons 59, 59*a* (Figure 8), as the first part of a "blow-and-blow" forming cycle.

Referring more particularly to Figure 3, the operating mechanism includes a vertically disposed generally cylindrical housing 60 mounted below and generally in alignment with the pair of blank molds 1 and 2. Suitable provision is made for effecting vertical adjustment of the housing 60 as, for example, by providing its lower end with an adjusting head plate 61 having an inclined lower surface 62 which is adapted to be moved vertically by a horizontally movable wedge 63. Advancement and retraction of the wedge 63 to raise or lower the housing 60 a regulable amount is effected by a bolt and nut adjustment assembly 64. The housing 60 carries superstructure shown at 60*a*, 60*b* and 60*c*.

The interior of the housing 60 is provided with a vertically disposed cylindrical bore 65 in which is located a piston 66 having superstructure 66*a*, 66*b* and 66*c* to the upper end of which a pair of thimble members 67, 68 are removably secured, as by means of split rings 69. The thimbles 67 and 68, respectively, are axially aligned with the blank molds 1 and 2 and may be moved into engagement with the neck ring molds 5 and 6 by air or other fluid medium which is supplied under pressure through a line 70 into the bottom of the cylinder 65 to raise the piston 66 to the position shown in Figure 3. While fluid pressure or other means such as springs may be employed, in the present embodiment, when the pressure in line 70 is relieved, gravity returns the piston 66 to the bottom of cylinder 65 thus retracting the thimbles. An annular shoulder portion 66*d* of the piston chokes the exhaust of fluid from the bottom of the cylinder through portion 70*a* of line 70 and cushions the end of the piston's downstroke. A check valve 71 permits prompt flow of the pressure medium from line 70 to the cylinder so that the choked passage 70*a* does not delay the promp upward stroke of the piston 66 from its retracted position.

As shown in Figure 3, the plungers 57 and 57*a* are detachably secured, as by threads 72, to the upper ends of a pair of sleeves 73 and 74 that are themselves secured on the threaded upper ends 75*a* and 76*a* of a pair of piston rods 75 and 76, the lower ends of the rods being secured to a pair of pistons 77 and 78 operably mounted in cylindrical bore portions 79 and 80 of the piston 66. As thus mounted, the plungers 57 and 57*a* are axially aligned with and guided by their respective thimbles 67 and 68 as they are raised and lowered by the pistons 77 and 78.

In the illustrated embodiment, the pistons 77 and 78 and the plungers 57 and 57*a* which they respectively operate are independently raised and lowered by air pressure. More particularly, the air pressure for retracting the piston 77 is supplied by a pipe-line 81 and introduced into the upper end of the cylinder 79 through a passage 81*a* in the bottom plate 61 and a passage 82 in the piston 66, the passages 81*a* and 82 being connected through a supply pipe 83 and a packing gland 84 which permit movement of the piston 66, without interrupting the air supply. Similar components are provided for retracting the piston 78 including pipe-line 85, passage 86, pipe 87, gland 88 and passage 89.

Air pressure is introduced from a line 90 (Figure 6) upwardly through pipe 91

(Figure 3) into the bottom of cylinder 80 to raise the piston 78 and move the plunger 57*a* upwardly within the outer thimble 67 to its pressing position. Similarly, air is introduced from a line 92 (Figure 6) upwardly through pipe 93 (Figure 3) into the cylinder 79 to raise the piston 77 and move the plunger 57 to its upper or pressing position within the thimble 68.

Referring more particularly to the thimble 67, it is conically tapered as at 67*a* so as to be self-centring with a conforming conical recess 94 in an inset 95 carried by the neck ring mold 5. The inset 95 and the two halves of the neck ring mold 5, one of which is indicated at 5*a*, Figures 2 and 3, are provided with sufficiently deep flanges and cooperating recesses so that the inset 95 is loosely supported when the neck ring halves are open and firmly secured and centered when the neck ring mold is closed. The self-centring of the thimble relative to the closed neck ring mold 5 serves to center the pressing plunger 57*a* relative to the neck ring mold 5 and the blank mold 1, the latter being centered relative to the neck ring by a conical projection 96 extending upwardly from the neck ring mold into a conforming recess in the bottom of the blank mold 1.

The heretofore described components associated with the plunger 57*a* at the right of Figure 3 are duplicated by like components associated with the plunger 57 located at the left of Figure 3.

It will be seen that by suitably timing the introduction of air through the pipe-lines 70, 90 and 92 any desired simultaneous or relative movement of the pressing plungers 57 and 57*a* and the thimbles 67 and 68 may be had. It will also be apparent that when a blank of different shape or size is desired it is merely necessary to change the blank mold 1, the neck mold 5 and the pressing plunger 57*a* and these changes may be effected without any change in the mechanism for operating those members.

Means are provided for conducting cooling air from a pipe-line 97 to the interior of the right hand plunger 57*a* (Figure 3), including a duct 98 formed in a protruding portion 98*a* of the housing 60, a sliding connection 99 formed by gland 100 and pipe 101, together with duct 102 and distributor 103. It will be seen that the sliding connection 100 assures that cooling air may be supplied from the line 97 into the interior of the plunger 57*a* at both its raised and lowered positions and while moving therebetween.

The cooling air is exhausted from the plunger 57*a* through port 104 which communicates with an annular chamber 105 at the base of the plunger and from which cooling air is exhausted downwardly through passageways 106 and 107 and out through exhaust pipe 111 (Figure 5), a sliding connection similar to 99 (Figure 3) being provided to maintain communication between passageway 107 and pipe 111 during movement therebetween.

Similar components are provided for independently supplying cooling air to the left-hand plunger 57 (Figure 3), including supply pipe 112 and exhaust pipe 113 (Figure 5).

The present invention contemplates the ready interchangeability of the pressing plungers 57 and 57*a* (Figure 3) with the neck pins 58 and 58*a* (Figure 8) and the ready conversion of the machine from a "press-and-blow" to a "blow-and-blow" cycle. It will be understood that in the "blow-and-blow" cycle, parisons 59 and 59*a* are formed by a blowing operation rather than the pressed blanks 56 and 56*a* formed by the plungers 57 and 57*a*, the same mechanisms heretofore described in connection with Figure 3 being used to operate the neck pins 58 and 58*a* as are employed to operate the plungers 57 and 57*a*.

Referring more particularly to Figure 8, the neck pins 58 and 58*a* each comprises a lower portion 115 and an upper portion 116, the lower portions 115 being secured by the screws 15 to the upper end of the piston rods 75 and 76 and the upper portions 116 being secured to the lower portions 115 by split rings 117. Bushings 118 (Figure 8) replace the thimbles 67 and 68 of the pressing plunger assembly (Figure 3) and support at their upper ends shorter thimbles 119 which are secured thereto by rings 120. The upper ends of the thimbles are engageable by neck ring molds 5' and 6' which replace the neck ring molds 5 and 6 of the "press-and-blow" assembly heretofore described in connection with Figure 3. Similarly, parison molds 121 and 122 replace the blank molds 1 and 2 of the "press-and-blow" assembly.

It will be seen that the engagement of the thimbles 119 by the closed molds 121 and 122 act to centre the neck pins 58 and 58*a* and assure uniform finish thickness for the narrow neck parisons.

The parisons 59 and 59*a* are counterblown within the molds 121 and 122 by air pressure which is introduced through the supply pipes 97 and 112, axial passageways 124 being provided through the neck pins 58 and 58*a* which communicate at their lower ends with the ducts 102 in the piston rods 75 and 76. It will be seen that the sliding connections 99 (Figure 2) in the supply lines to the neck pins 58 and 58*a* maintain communication between the counterblowing air lines 97 and 112 of the parisons 59 and 59*a* and their respective counterblowing outlets 124 in every position to which the neck pins 58 and 58*a* may be raised or retracted by their respective pistons 77 and 78.

The illustrated embodiments of the present invention, in addition to providing actuating

mechanism for producing preforms or blanks selectively by pressing or blowing, also provides for single or double gob operation without replacement of the forming mechanism. More particularly, the mechanism for selectively actuating the plungers 57*a* or the neck pin 58*a* may be rendered inoperative while permitting the normal operation of the left-hand or outer plunger 57 (Figure 3) or neck pin 58 (Figure 8) for single gobbing in the blank mold 2 and parison mold 122. When the forming machine is being single-gob operated, it is contemplated that the opening in the housing 60 above the piston rod 76 will be capped by a plate (not shown) to prevent dirt or other foreign matter entering the housing.

STROKE ADJUSTMENT OF PRESSING PLUNGERS

An adjustable stop member 127 is provided having a pair of rubber bumpers 128 and 129 (Figure 3) for limiting the down positions to which plungers 57 and 57*a* are drawn by their respective actuating piston rods 75 and 76. A "press-and-blow" operation involves proper adjustment of the bumpers 128 and 129 so that the plungers 57 and 57*a* when retracted are properly positioned to receive the glass charges in the up-position of the thimbles and to permit the blanks 56 and 56*a* to clear the plunger tips when the blanks are transferred to the blow mold station C.

The stop 127 (Figure 4) is non-rotatably but operatively mounted on a threaded shaft 130 so that rotation of the shaft serves to raise or lower the stop 127 whereby the bumpers 128 and 129 will engage shoulders 131 and 132 of the respective rods 75 and 76 in their downward travel and limit the stroke of the rods in accordance with the adjustment of the stop 127. The shaft 130 is rotatably supported at its ends within the piston 66 and has pinned to it adjacent the upper end, a sprocket 133 for effecting its rotation by means of chain 134 and sprocket 135 which is keyed to a second shaft 136 rotatably mounted in the piston 66. Splined in the upper end of shaft 136 for rotation therewith, is a similar co-axially aligned shaft 137 which has pinned to its upper end a worm gear 138 operably-engaged by a worm 139. It will be apparent that rotation of shaft 140, to which the worm 139 is secured, serves to raise or lower the adjustable stop 127 depending upon the direction the shaft 140 is turned. It also will be apparent that the splined engagement of shafts 136 and 137 provides for the adjustment regardless of the position at which the piston 66 has been located relative to the stationary frame member in which shaft 140 is rotatably mounted. The rotating adjustment of shaft 140 may be effected in any conventional manner as by means of a crank (not shown).

MEANS FOR INDICATING POSITIONS OF PRESSING PLUNGERS

Figure 7 illustrates a pair of indicators 108 and 109 for visually indicating to the machine operator the position of the pressing plungers 57 and 57*a* or neck pins 58 and 58*a* at all times. More particularly, the indicators 108 and 109 comprise a pair of tappet pins 108*a* and 109*a* each of which is vertically and reciprocally mounted in its own bore through portion 60*c* of the stationary frame 60 and spring pressed into engagement with its own tappet arm 108*b* and 109*b*, respectively, which, as shown in Figure 5, project from and are integral parts of the piston rods 75 and 76. Thus when the concealed plungers 57 and 57*a* are moved in or out of the molds 1 and 2, their respective indicator pins 108*a* and 109*a* move a like amount and the positions of the pins relative to the portion 60*c* of the stationary housing 60 indicate the positions of the plungers relative to the housing and to each other.

BLANK FORMING OPERATION

The operation at the blank-forming station A is substantially the same whether the forming operations are performed by the pressing plungers 57 and 57*a* as a part of a "press-and-blow" cycle or the neck pins 58 and 58*a* as part of a "blow-and-blow" forming cycle.

In the case of the "press-and-blow" operation, the plungers 57 and 57*a* are retracted to their lower position of travel and thimbles 67 and 68 are raised and engaged by the neck ring molds 5 and 6, as shown in Figure 3. The blank molds 1 and 2 are closed in alignment with the neck ring molds 5 and 6 and a glass charge or gob delivered to each blank mold 1 and 2 by a suitable delivery means (not shown). Baffle heads 125 and 126 are thereupon moved to the positions illustrated in Figure 3 so as to close the blank molds, and the plungers 57 and 57*a* are independently raised by the introduction of air pressure into the lines 92 and 90 to press the gobs into the blanks 56 and 56*a* as shown in Figure 3.

In the "blow-and-blow" cycle, after the termination of a molding operating in the parison molds 121 and 122, the neck pins 58 and 58*a* (Figure 8) are elevated by admitting fluid under pressure into the cylinders 79 and 80 through the pipes 92 and 90 (Figure 3). As soon as this is accomplished, the next mold charges may be delivered to the parison molds and compacted in the neck molds and on the neck pins by air pressure from the settle blowheads 125*b* and 126*b*. It will be understood that suitable actuating mechanism (not shown) may be provided for moving the settle blowheads 125*b* and 126*b* into engagement with the parison molds 121 and 122 in proper timed relation to the operation of the other com-

ponents of the forming machine.

After the compacting operation, baffle plates 125*c* and 126*c*, which may form part of the respective blowheads 125*b* and 126*b*, are moved into engagement with the molds 121 and 122 to act as bottom plates or baffles for the counterblowing operation. During these latter movements, the neck pins 58 and 58*a* are retracted by introducing air pressure in the lines 81 and 85 and exhausting air through the pipes 90 and 92 to depress their respective pistons 77 and 78. Counterblowing pressure is supplied through the pipes 97 abd 113, and discharged from the outlets 124 in the neck pins 58 and 58*a* to counterblow the parisons 59 and 59*a*. Thereafter the counterblowing pressure is shut off and, if desired, the parison molds 121 and 122 are cracked open so that the chilled skin of the parisons are permitted to reheat to some extent. The parsion molds 121 and 122 now are opened wide by introduction of air pressure to the cylinder 23 through the pipe 25, and the two parisons 59 and 59*a*, supported solely by the neck ring molds 5' and 6', are transferred to positions at the blowing station C following retraction of the thimbles 119.

We have not in the above given any detailed description of the construction and operation of the transfer device as this does not *per se* form part of the present invention. Any suitable known device for this purpose may be employed. Nor have we described the means for or operation of finish blowing in the blow or finish molds as this may be effected in any known or customary way.

What we claim is:—

1. A glassware forming machine for selectively making blown and pressed and blown ware having a preform (blank or parison) mold provided with a neck ring, a carrier forming a permanent part of the machine on which carrier a neck pin or a pressing plunger may be interchangeably mounted, said carrier being reciprocable selectively to advance or retract a neck pin into and out of the neck ring or a pressing plunger into and out of the blank mold.

2. A glassware forming machine in accordance with Claim 1 wherein the stroke of the carrier is variable so as to adapt it to the required stroke length when either a neck pin or a pressing plunger is mounted on the carrier.

3. A glassware forming mechanism in accordance with Claims 1 or 2, having stop mechanism adjustable during operation of the actuating mechanism for limiting the movement of the pressing plunger or neck pin.

4. A glassware forming machine in accordance with any of Claims 1–3, wherein there are a pair of preform moulds and the said carrier has interchangeably mounted therein a pair of neck pins or a pair of pressing plungers for movement to and from said preform molds respectively.

5. A glassware forming machine in accordance with Claim 4, wherein one of each pair of neck pins or one of each pair of pressing plungers may be rendered inoperative without discontinuing the operation of the other of said pair whereby the machine may be adapted to either single or double gob feeding.

6. A glassware forming machine in accordance with Claim 4 or 5, having means for selectively supplying cooling air independently to each plunger and counter-blowing air independently about each neck pin.

7. A glassware forming machine in accordance with Claim 6, having means for rendering the actuating and air-supplying means associated with one of said preform molds inoperative while maintaining operative the actuating and air-supplying means of the other preform mold.

8. A glassware forming machine in accordance with any of the preceding claims having means for indicating the hidden positions of the plunger and interchangeable neck pin.

9. A glassware forming machine in accordance with any of Claims 1–8, wherein the actuating mechanism for the reciprocable pressing plunger and the neck pin interchangeable therewith comprises a pneumatically operated piston to the upper portion of the piston rod of which either a pressing plunger or a neck pin is demountably secured.

10. A glassware forming machine in accordance with Claim 9, having an adjustable stop associated with said piston rod for limiting the lower position of the neck pin and plunger, the said stop being manually adjustable between positions suitable for a neck pin and one suitable for a pressing plunger.

11. A glassware forming machine of the kind referred to having as a permanent part of its mechanism a single carrier for an interchangeable pressing plunger and neck pin substantially as and for the purpose hereinbefore described with reference to the accompanying drawings.

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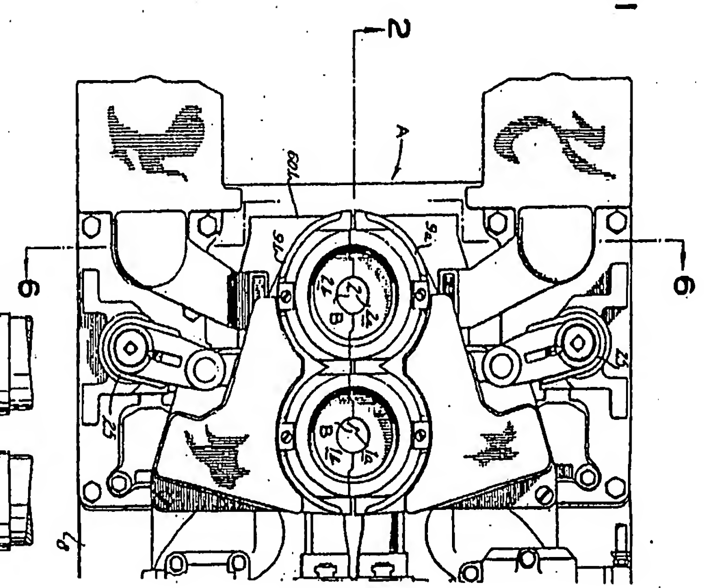

FIG. 1

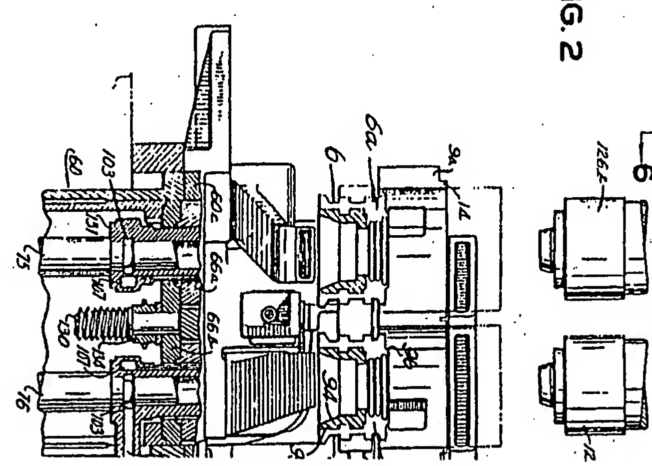

FIG. 2

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2 SHEETS
SHEET 1

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FIG. 1

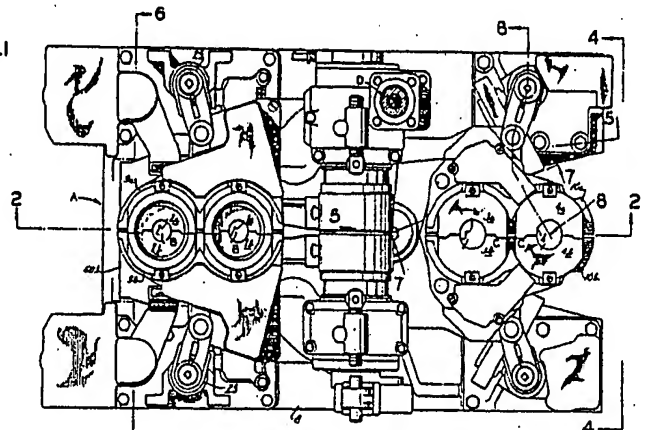
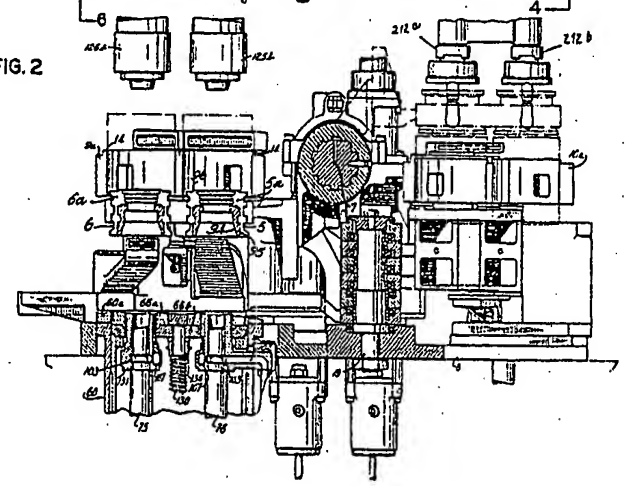


FIG. 2



H.M.S.O. (M.F.P.)

2 SHEETS
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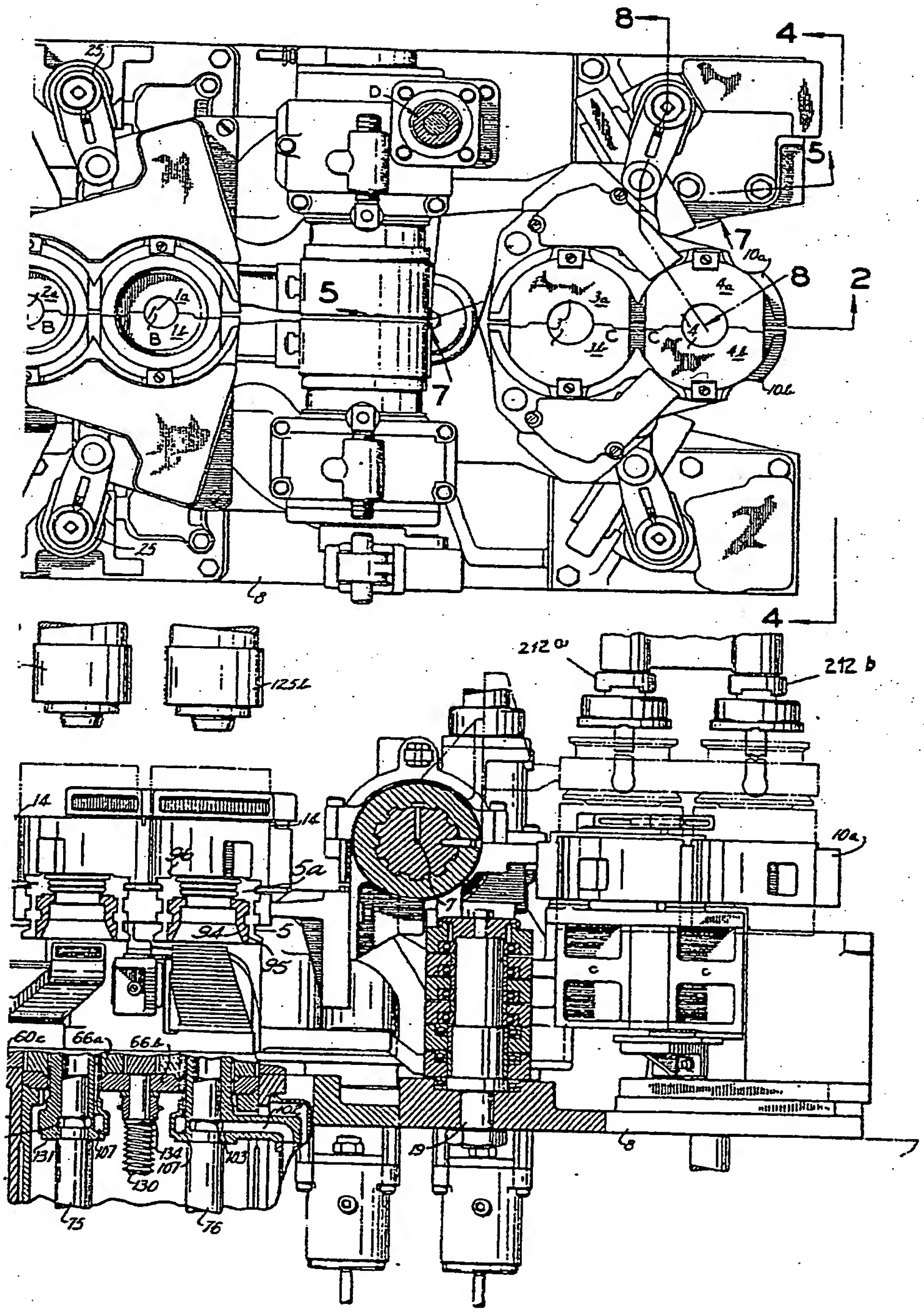


H.M.S.O. (M.F.P.)

FIG. 3

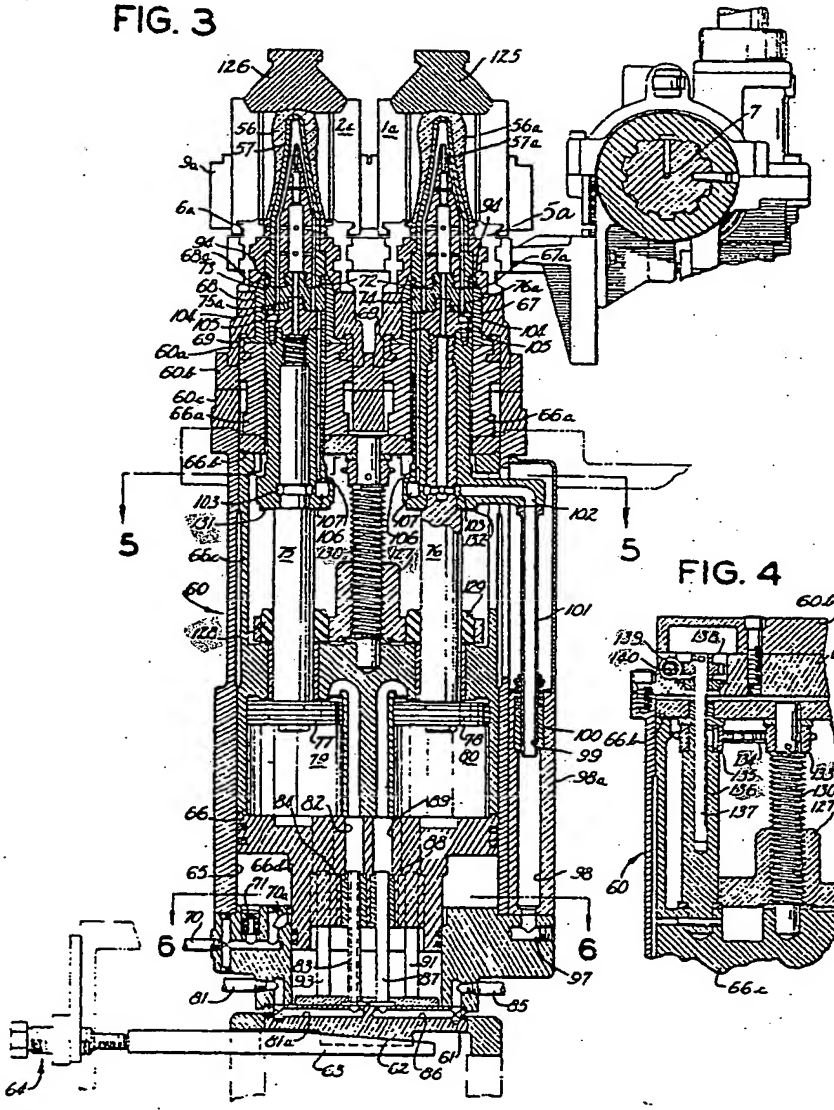


FIG. 4

FIG. 5

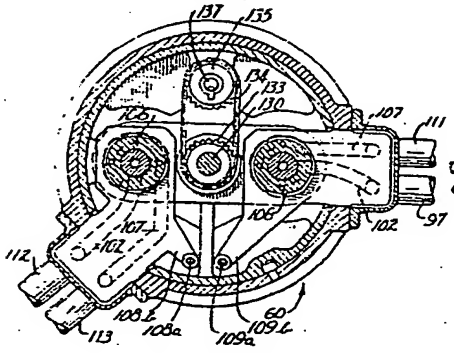
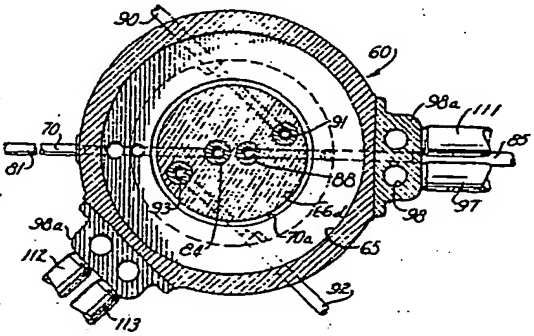


FIG. 6



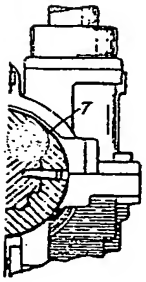


FIG. 8

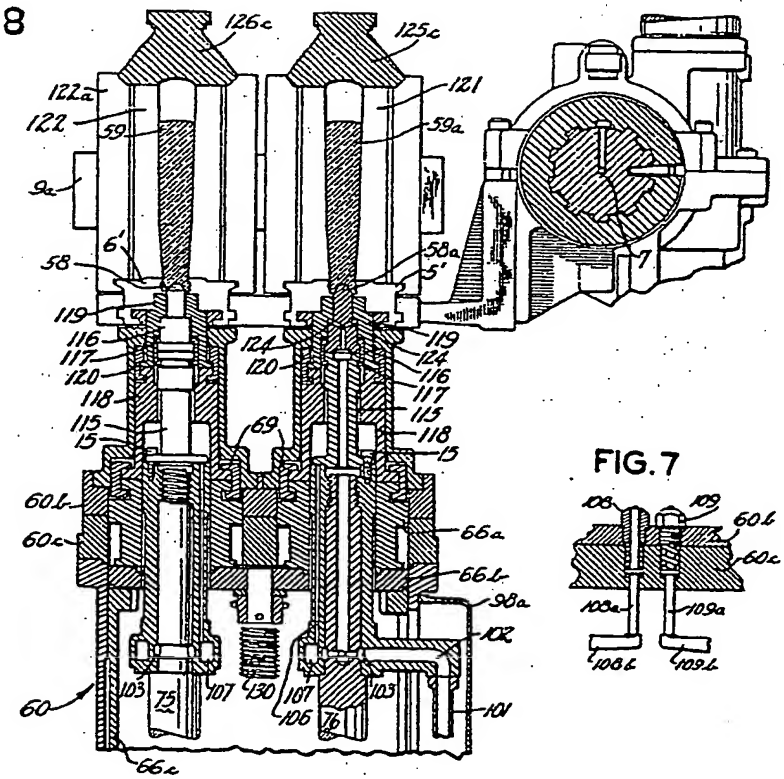


FIG. 4

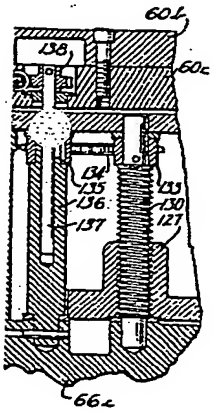


FIG. 7

): <GB____668983A__I_>

FIG. 3

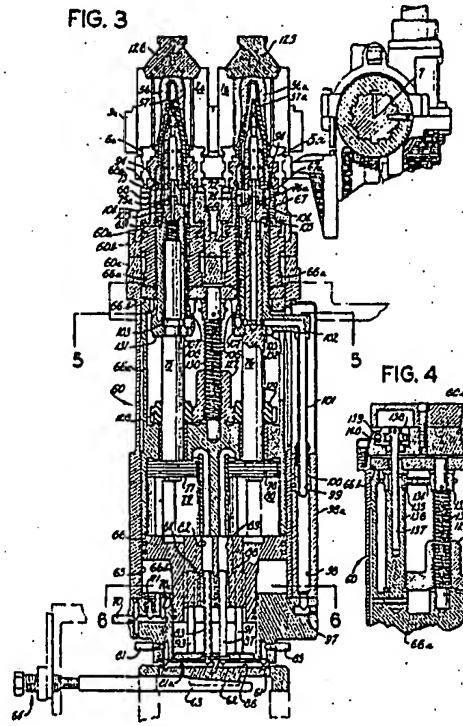


FIG. 4

FIG. 5

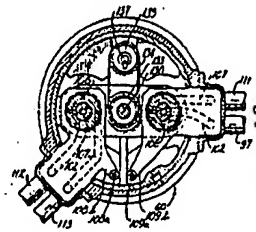


FIG. 6

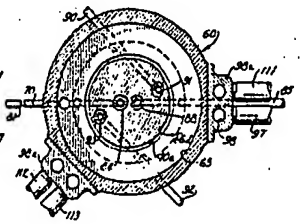


FIG. 8

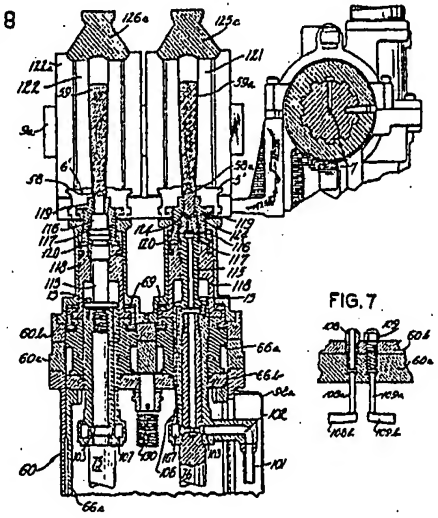


FIG. 7